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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/090,275	03/04/2002	Joseph F. Sinnott JR.	SVL920010088US1	6540

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EXAMINER	
LE, DEBBIE M	

ART UNIT	PAPER NUMBER
2167	

DATE MAILED: 04/07/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/090,275	SINNOTT, JOSEPH F.	
	Examiner	**Art Unit**	
	DEBBIE M LE	2167	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on 26 November 2004.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 1-18 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 1,2,5-8,11-14,17 and 18 is/are rejected.

7)☒ Claim(s) 3,4,9,10,15 and 16 is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

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DETAILED ACTION

Response to Amendment

Applicant's arguments filed on 11/26/04. Claims 1, 7 and 13 are amended. Claims 1-18 are presented for examinations.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1-2, 5-8, 11-14, 17-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Krishna (U.S Patent 6,138,111) in view of Iyer et al (US patent 5,345,585).

As per claim 1, Krishna discloses the recited limitations as follows:

'a computer-based method for determining the optimum join sequence for processing a query having a plurality of tables from a relational database stored in an electronic storage device having a database management system' *as the process of a join order optimization for a multiple join queries in a relational database management system* [See col. 1, lines 5-6], the method comprising the steps of:

'a first pass for determining an optimum join sequence for joining the plurality of tables from the query' *as the calculating an optimal order for join of tables in a multiple join query* [See Fig. 1, col. 3, lines 24-26, 31-32];

'a second pass for using the optimum join sequence for creating a lowest cost access path plan for processing the query' *as a join order selected among other possible join orders, wherein the selected join order has the smallest sigma (i.e., lowest cost) and the optimal access path to perform the join query* [See Fig. 2, col. 3, lines 44-50].

Krishna does not explicitly teach a first using simulation. However, Iyer teaches using simulation for determining an optimum join sequence *(col. 5, lines 12-27)*. Thus, it would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the teachings of the cited references to use a simulation for determining an optimum join sequence as disclosed by Iyer. This would allow users of Krishna's system to perform all possible join plan (join order) having the minimal cost is the optimal solution plan, so that the optimal solution plan (i.e., a low cost join plan) can be performed in a relatively short period of time. A good join plan enables a query to be processed and data retrieved in an effective manner so as not require excessive processing time, as suggested by Iyer (col. 7, lines 52-58, col. 6, lines 60-67).

As per claim 2, Krishna teaches 'wherein the first pass performing successive steps until creation of a simulated composite table having all tables from the query' *as a joining of a plurality of tables R, S, and T from the query* [See col. 3, lines 31-32]. *There are two possible join orders for the tables R, S, and T. The first (1) possible join order is*

join tables R and S, then join the result with table T; the second (2) possible join order is join tables S and T, then join the result with table R [See col. 3, lines 33-35], 'wherein each said step:

creating a set of miniplans for simulating all possible joins of a predetermined subset of the query tables' *as after joining the two possible join orders, the calculation of the total query for the join order (1) is 80(20+60) and the join order (2) is 560(500+60) are created* [See col. 3, lines 35-41]; and

'using a cost model calculations for estimating and saving the least expensive join from said set of joins, thereby determining the optimum join sequence' *as the cost estimate calculations for the join order (1) is 80 and the join order (2) is 560. Thus, the join order (1) is indicated the least expensive join order from the set of join orders* [See col. 3, lines 52-55].

As per claim 5, Krishna teaches 'wherein the second pass performing successive steps until creation of a simulated composite table having all tables from the query, wherein each said step being performed in the optimum join sequence' *as if the join orders remain to be examined, the process repeats for the next possible join order. A join order with the smallest value is used to perform the join query* [See col. 4, lines 4-7].

As per claim 6, Krishna teaches 'wherein the query being a SQL query' *as an SQL query* [See col. 4, lines 38-40].

As per claim 7, Krishna discloses the recited limitations as follows"

'a computer-based processor system for determining the optimum join sequence for processing a query having a plurality of tables from a relational database stored in

an electronic storage device having a database management system' *as the process of a join order optimization for a multiple join queries in a relational database management system* [See col. 1, lines 5-6], 'the system comprising:

means for performing a first pass for determining an optimum join sequence for joining the plurality of tables from the query' *as the calculating an optimal order for join of tables in a multiple join query* [See Fig. 1, col. 3, lines 24-26, 31-32]; and

'means for performing a second pass for using the optimum join sequence for creating a lowest cost access path plan for processing the query' *as a join order selected among other possible join orders, wherein the selected join order has the smallest sigma (i.e., lowest cost) and the optimal access path to perform the join query* [See Fig. 2, col. 3, lines 44-50].

Krishna does not explicitly teach a first using simulation. However, Iyer teaches using simulation for determining an optimum join sequence *(col. 5, lines 12-27)*. Thus, it would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the teachings of the cited references to use a simulation for determining an optimum join sequence as disclosed by Iyer. This would allow users of Krishna's system to perform all possible join plan (join order) having the minimal cost is the optimal solution plan, so that the optimal solution plan (i.e., a low cost join plan) can be performed in a relatively short period of time. A good join plan enables a query to be processed and data retrieved in an effective manner so as not require excessive processing time, as suggested by Iyer (col. 7, lines 52-58, col. 6, lines 60-67).

As per claim 8, Krishna teaches 'wherein the first pass means performing successive steps until creation of a simulated composite table having all tables from the query' *as a joining of a plurality of tables R, S, and T from the query* [See col. 3, lines 31-32]. *There are two possible join orders for the tables R, S, and T. The first (1) possible join order is join tables R and S, then join the result with table T; the second (2) possible join order is join tables S and T, then join the result with table R* [See col. 3, lines 33-35], 'wherein each said step:

creating a set of miniplans for simulating all possible joins of a predetermined subset of the query tables' *as after joining the two possible join orders, the calculation of the total query for the join order (1) is 80(20+60) and the join order (2) is 560(500+60) are created* [See col. 3, lines 35-41]; and

'using a cost model calculations for estimating and saving the least expensive join from said set of joins, thereby determining the optimum join sequence' *as the cost estimate calculations for the join order (1) is 80 and the join order (2) is 560. Thus, the join order (1) is indicated the least expensive join order from the set of join orders* [See col. 3, lines 52-55].

As per claim 11, Krishna teaches 'wherein the second pass means performing successive steps until creation of a simulated composite table having all tables from the query, wherein each said step being performed in the optimum join sequence' *as if the join orders remain to be examined, the process repeats for the next possible join order. A join order with the smallest value is used to perform the join query* [See col. 4, lines 4-7].

As per claim 12, Krishna teaches 'wherein the query being a SQL query' *as an SQL query* [See col. 4, lines 38-40].

As per claim 13, Krishna discloses the recited limitations as follows:

'a computer usable medium tangibly embodying a program of instructions executable by the computer to perform a computer-based method for determining the optimum join sequence for processing a query having a plurality of tables from a relational database stored in an electronic storage device having a database management system' *as the process of a join order optimization for a multiple join queries in a relational database management system* [See col. 1, lines 5-6], 'the method comprising the steps of:

'(a) a first pass for determining an optimum join sequence for joining the plurality of tables from the query' *as the calculating an optimal order for join of tables in a multiple join query* [See Fig. 1, col. 3, lines 24-26, 31-32]; and

'(b) a second pass for using the optimum join sequence for creating a lowest cost access path plan for processing the query' *as a join order selected among other possible join orders, wherein the selected join order has the smallest sigma (i.e., lowest cost) and the optimal access path to perform the join query* [See Fig. 2, col. 3, lines 44-50].

Krishna does not explicitly teach a first using simulation. However, Iyer teaches using simulation for determining an optimum join sequence *(col. 5, lines 12-27).* Thus, it would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the teachings of the cited references to use a simulation for

determining an optimum join sequence as disclosed by Iyer. This would allow users of Krishna's system to perform all possible join plan (join order) having the minimal cost is the optimal solution plan, so that the optimal solution plan (i.e., a low cost join plan) can be performed in a relatively short period of time. A good join plan enables a query to be processed and data retrieved in an effective manner so as not require excessive processing time, as suggested by Iyer (col. 7, lines 52-58, col. 6, lines 60-67).

As per claim 14, Krishna teaches 'wherein the first pass performing successive steps until creation of a simulated composite table having all tables from the query' *as a joining of a plurality of tables R, S, and T from the query* [See col. 3, lines 31-32]. *There are two possible join orders for the tables R, S, and T. The first (1) possible join order is join tables R and S, then join the result with table T; the second (2) possible join order is join tables S and T, then join the result with table R* [See col. 3, lines 33-35], 'wherein each said step:

creating a set of miniplans for simulating all possible joins of a predetermined subset of the query tables' *as after joining the two possible join orders, the calculation of the total query for the join order (1) is 80(20+60) and the join order (2) is 560(500+60) are created* [See col. 3, lines 35-41]; and

'using a cost model calculations for estimating and saving the least expensive join from said set of joins, thereby determining the optimum join sequence' *as the cost estimate calculations for the join order (1) is 80 and the join order (2) is 560. Thus, the join order (1) is indicated the least expensive join order from the set of join orders* [See col. 3, lines 52-55].

As per claim 17, Krishna teaches 'wherein the second pass performing successive steps until creation of a simulated composite table having all tables from the query, wherein each said step being performed in the optimum join sequence' *as if the join orders remain to be examined, the process repeats for the next possible join order. A join order with the smallest value is used to perform the join query* [See col. 4, lines 4-7].

As per claim 18, Krishna teaches 'wherein the query being a SQL query' *as an SQL query* [See col. 4, lines 38-40].

Allowable Subject Matter

Claim 3 recites in specific details an unconventional query optimization approach at the lowest cost possible. Particularly, it requires that a first pass for each miniplan store a used index table and a join method to then sort the data for each least expensive join names of joined tables. One of ordinary skill in the art would not be able to derive the specific steps recited in claim 3 from the general propositions of claims 1 and 2. It should be noted that numerous approaches for optimizing queries have been suggested in the database art. Although the various approaches for optimizing queries have done so through minimizing the access path for minimizing query processing time, they do not necessarily keep track of the queries in the manner suggested by applicant as recited in claim 3. Therefore, even though the Krishna and Iyer references disclose sufficient limitations to anticipate claims 1 and 2, the specific limitations of claim 3 would not be readily ascertainable from such disclosure.

Claims 3-4, 9-10, 15 and 16 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Response to Arguments

Applicant's arguments with respect to claim 1, 7 and 13 have been considered but are moot in view of the new ground(s) of rejection because Applicant has amended claims 1, 7, and 13 to include a new limitation "using simulation".

Applicant argued that Krishna does not teach the limitation "simulated or simulating" of claim 2, 8, and 14.

In response, the examiner respectfully submits "simulated or simulating" is not specific to distinct over the applied prior art. Based on dictionary, definition of *simulation: The imitation of a physical process or object by a program that causes a computer to respond mathematically to data and changing conditions as though it were the process or object itself* (Microsoft Press Computer Dictionary, page 437). Given the broadest claim interpreted, "creating a set of miniplans" as Sigma is defined as the sum of the number of tuples, wherein miniplans are "for simulating all possible joins" as a Sigma is used to pick from each join as it is performed in a join order among possible join orders (col. 3, lines 44-47).

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to DEBBIE M LE whose telephone number is (571) 272-4111. The examiner can normally be reached on 8:30-5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, JOHN BREENE can be reached on (571) 272-4107. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

DEBBIE M LE
Examiner
Art Unit 2167

Debbie Le

April 1, 2005.

[illegible]ETA ROBINSON
[illegible]Y EXAMINER